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Circular No. 28 - Contagious Abortion in Mares and Cows

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Utah Agricultural College

EXPERIMENT STATION

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By

H. J. FREDERICK

Logan, Utah, March, 1918

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CONTAGIOUS ABORTION IN MARES AND COWS

By
H. J. FREDERICK

Contagious abortion is a cause of great loss to the stock growers of Utah. There is an urgent demand from nearly all parts of this State for information relative to this disease. In an effort to satisfy this demand a few facts regarding the disease as they are now known are here presented. It is not the purpose of this circular to report original research, but merely to describe the disease as it exists among animals in this State. The causes, symptoms, diagnosis, and methods of combating and controlling this great menace to the livestock industry are all considered.

DISTRIBUTION

Contagious, or infectious, abortion is found to exist in nearly all parts of the United States and in Europe. This disease, unless controlled or eradicated, will be even a greater scourge to animal industry than tuberculosis. To learn that contagious abortion is prevalent in this State a person has only to visit the different localities where large numbers of animals are bred and hear reports of the percentages of the colt and calf crop that obtains yearly. More complaints come in from breeders in the different parts of this State regarding contagious abortion than all other diseases together. It seems to exist nearly everywhere in Utah among horses and dairy and range cattle.

KINDS OF ABORTION AND CAUSES

All abortions are not necessarily contagious or infectious. We recognize accidental abortion which is due to a disease or accident of the mother or foetus. Among the causes of accidental abortion may be mentioned: Mechanical injuries due to blows or falls received by the dam, or due to standing on floors that are too sloping, or that are impeded by deep gutters, to railroad journeys, or to pregnant animals riding the non-pregnant ones that are in heat. Improper feeding and poorly balanced rations that do not contain enough mineral matter, intestinal parasites, hemorrhages and unhealthy surroundings are also causes. Again it may be caused by backing vigorously or by bloating which exerts pressure on the uterus and foetus. Diarrhea and straining, stones in the bladder, diseases of the heart leading to disturbances of the foetal cir-

culation, ergotized, smutty or rusty fodder, sudden changes of feed, deprivation of water, causing constipation and straining, ice water, putrid water, frozen feed, diseases of the genital organs and foetal membranes and obstruction of the umbelical cord through which the foetus is to get its nourishment and to expel wastes,—all these cause abortion. Poisons may also be responsible for abortion as well as medicines that are too strong or given in too large doses. Nervous shocks, such as fright and obnoxious odors from dead animals or from retained afterbirth sometimes cause the trouble. All these conditions with many more may be responsible for accidental abortion.

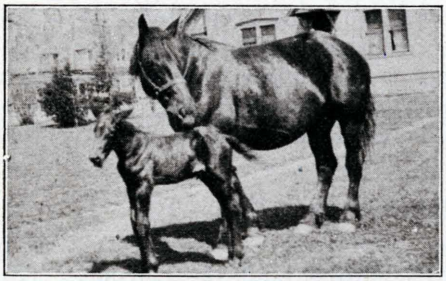


Fig. 1—Colt weakened by infected mother.

Symptoms of accidental abortion are variable. Animals aborting during early periods of pregnancy show little or no disturbance. During the latter half of pregnancy, when abortion is caused by an injury, the symptoms are more serious. Loss of appetite, dullness, restlessness, and abdominal pains are commonly noted. The animal may need assistance in expelling the foetus.

The majority of abortions of animals are, however, due to contagious abortion which is generally agreed by investigators to be caused by a disease germ; at least a germ has been found in most cases investigated where an abortion of this nature occurred. However, each species of animal has its specific germ or bacteria that is responsible for abortion and it is not supposed to be transmissible from mare to cow or vice versa.

HISTORY

Contagious abortion of mares was first noticed in the United States in 1886. It soon acquired a very extensive distribution and great losses were experienced yearly as the result. The disease was first noticed in this state about 1896. From that time it gradually increased until now it may be found in nearly all parts of the country.

It is caused by the *Bacillus abortus equi.* This highly infectious disease is usually brought into the herd or band by

some animal, either an imported one or one brought from some other place, or introducing a new stallion. The disease does not seem to occur except as the result of exposure to an animal which has previously aborted or to contaminated surroundings.

Contagious abortion in the mare may occur at any stage during pregnancy, which is true of most other animals; however, the abortion is most frequently observed when the foetus has acquired such considerable size that it can be noticed. After about the sixth or eighth month of gestation it most commonly occurs.

Many mares abort before this time, but owing to the size of the foetus and the way the mares are handled this is usually not detected. It is the common practice to breed mares to the stallion, then to re-try them about every 18 days. After they have been re-tried two or three times in this way and have

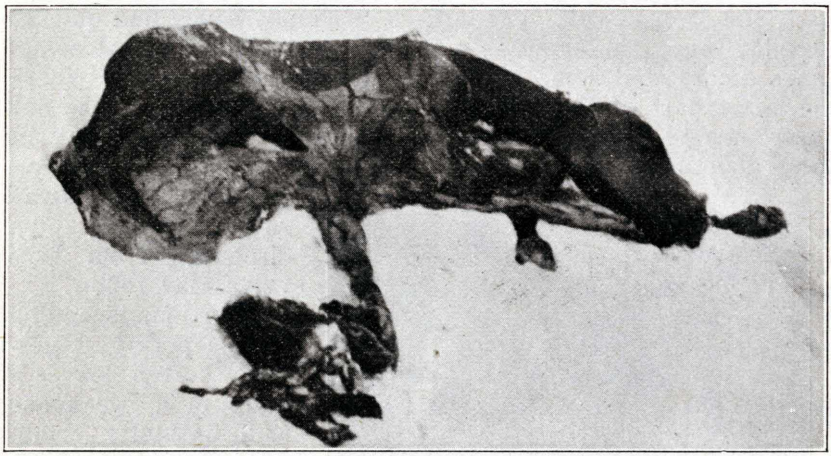


Fig. 2—Dead foetus of colt aborted as a result of infection.

refused service, the owners usually consider them safely settled; but later some of these animals show oestrum and then are re-bred. The owner wonders what is the trouble. In many instances such mares have aborted but were never noticed by the owner; as such animals seldom show signs of any accident, the foetus is aborted unnoticed. On a number of occasions it has been observed with mares that were stabled and worked.

Contagious abortion of mares is most frequently seen and attains its greatest virulence in those localities where horse

breeding is extensively practised and the animals have a high value. Naturally in such places a greater number of mares are kept and this involves their being kept in close contact on the feed lot, in the stables or on the pasture or range.

SYMPTOMS OF CONTAGIOUS ABORTION IN MARES

The symptoms of contagious abortion in the mare depend very largely upon the stage of gestation at which the disease appears. During the early stages of pregnancy the symptoms usually pass unnoticed, as it is only by chance that abortion is discovered during the first eight or ten weeks. Even in the advanced stages of pregnancy abortion often occurs without any noticeable symptoms other than finding the aborted dead foetus.

Some mares, especially when the foetus is nearly grown, manifest colicky pains and restlessness. This condition is often mistaken for colic.

If the foetus is not very large it is usually easily and quickly expelled much the same as a normal parturition; but it sometimes occurs that some trouble is experienced, especially where the latter part of the period of gestation is reached. It is not uncommon to have a retained afterbirth in such cases, but in those aborting during the early stages of gestation everything usually comes away without trouble and a discharge from the vulva may follow.

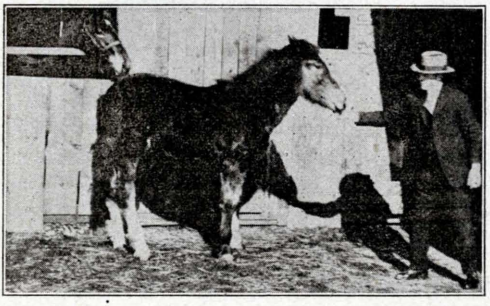


Fig. 3—Enlarged joints resulting from infection.

Abortion, depending on the period of gestation, often leaves a mare in a weakened and unthrifty condition, especially where the placenta is retained. In some cases blood poisoning and peritonitis and even paralysis may result. Some mares affected with abortion give birth to colts at full time, but often the colts are so weak they are unable to stand and nurse and soon die; others may be able to get around for a number of days, then develop swellings of one or more joints or other parts of the body. These swellings become painful and often cause the young animal to die or leave it with some impairment of movement,

with rheumatism, or with white diarrhea.

The length of time it takes this disease to manifest itself after it is introduced into the mare is variable, depending on the virulence and the number of germs introduced, together with the part of the body first infected. Some of our foremost investigators give the average duration of incubation in mild outbreaks as twelve days and in the severe outbreaks as four days, though this may vary as above stated.

HOW CONTAGIOUS ABORTION IS SPREAD

All investogators do not agree as to the avenues of infection. It probably occurs largely from direct contact. If a mare is introduced from an infected stable or band into your stables or pastures she usually transmits this infection to the animals with which she comes in contact. The tail of the mare readily becomes soiled and infected from the discharges of the vulva. This makes an excellent way for transmitting the infection to the animal next to it by switching. Again, mares often rub on fences or posts, etc.; others of the band rub on the same place and thus become infected.

Its spread may occur in an indirect manner wherever the earth or forage may have been contaminated such as in infected stables, bedding or litter, or infected bed grounds in pastures. It is claimed by some that the stallion, after becoming infected with this disease by service to a diseased mare, is responsible for disseminating it from mare to mare at each service. This danger may not be so great as generally supposed; however, it is not safe to conclude that he does not spread the infection in many cases.

Persons with soiled hands or clothing may be responsible for carrying this disease from one stable to another.

As in other infectious diseases which are capable of being carried by an intermediary bearer, there is constant possibility of transmission by means of portions of the afterbirth or foetus being carried from place to place through the agency of dogs, cats, or birds.

CONTAGIOUS ABORTION IN COWS

Contagious abortion in cows is even more prevalent in this state than in mares. At any rate it is more noticeable and more complaints are made about it. This is possibly due to there being more cows than mares. Although each dairyman has quite a number of cows, the average farmer does not have very many

mares. Contagious abortion occurs most frequently in dairy herds or where animals are closely housed, but is also found among the range cattle. Cows of all ages are more or less susceptible to the disease, although in their first or second pregnancy they are more apt to abort if exposed than at any other time. The specific cause of this infectious disease is a microscopic germ known as the *Bacillus abortus* of Bang. The best known and main symptoms of this disease is the death of and the expulsion of the immature foetus. This is accomplished by the entrance of the germ into the pregnant uterus where infection of the foetus occurs. Through the continuous attacks of the germs which rapidly increase in numbers when once started, a separation from the mother of the attachment of the membranes in whichc the foetus is found, is accomplished. This

Fig. 4—Abortion among pure-bred animals such as these would mean disaster to the breeder.

shuts off the nourishment from the foetus, thus causing its death. The foetus acting as a foreign body is then expelled or aborted from the uterus of the mother. Therefore abortion is only one of the symptoms and not the disease itself.

The germ causing the disease is found in the uterus of cows which have aborted or those having a retained afterbirth or other symptoms. It is often found in the udders and milk of cows; also in the internal organs of aborted foetuses, in

the lungs of living calves expelled before their time and in the joint cavities of calves born at full term. It sometimes happens that the disease-producing power of this germ is not great enough to kill the foetus, or the mother is strong enough to overcome it. In such cases the calf is born alive at full term. Sterility is often an after-effect of abortion due to the neglect of the infection or injury that has taken place in the mother. This may be only a temporary trouble owing to changes taking place in the organs. The germ causing this disease usually enters the body through the external genital organs, the udder, or through the mouth and digestive tract in very much the same way as the mare contracts it, by contact with infected animals or contaminated materials. It has been shown that the ingestion of food and water that have been contaminated with the discharges of aborting cows is a common method of causing the infection.

Fig. 5—Cows affected with contagious abortion.

It is maintained by many investigators that the bull is one of the main carriers of abortion. Since cows aborting are often in heat the same day or just a few days later, the bull serving such cows can infect others he may serve shortly after. Again,

it is found that some bulls carry this infection in their genital organs.

Abortion is closely associated with granular venereal disease, sterility and mamitis in cows, and white scours and navel infection in calves. Where cows abort some of the above troubles often follow.

It often happens that a cow becomes sterile either temporarily or permanently following an abortion. Calves are often born with very little vitality and may soon die, or they may develop swellings on different parts of the body—commonly the joints, or they may be affected with white scours, as these conditions often accompany abortion or may be a sequel to it.

SYMPTOMS IN COWS

In cows the symptoms of contagious abortion seem to be more pronounced than in the mare. It most frequently occurs or is noticed during the fifth or sixth month of pregnancy, yet it may take place earlier or later in much the same way as in the mare.

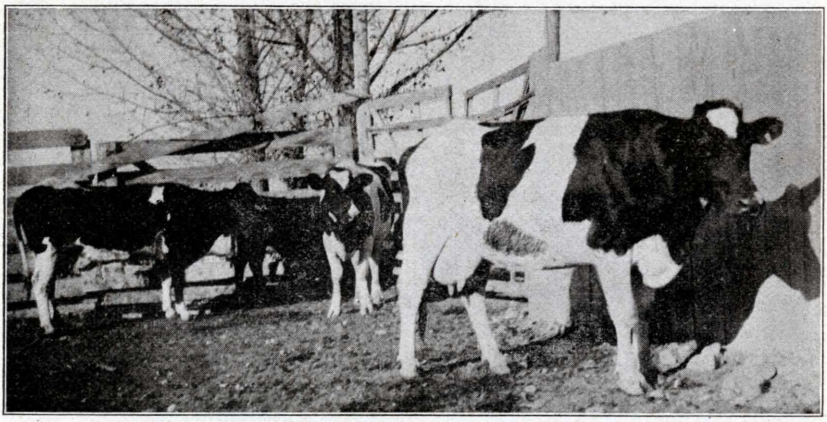


Fig. 6—Cows that have recovered after treatment.

In cows the symptoms of contagious abortion seem to be more pronounced than in the mare. It most frequently occurs or is noticed during the fifth or sixth month of pregnancy, yet it may take place earlier or later in much the same way as in the mare.

Abortion is usually preceded by a slight swelling of the udder

and vulva (the external orifice) with symptoms of genital catarrh and a discharge from the vagina of a reddish grey or yellow color. If the cow is giving milk usually the secretion is somewhat diminished in quantity and greatly resembles the first milk of a fresh cow. Two or three days later slight pains are manifested and abortion takes place.

After the abortion takes place there is often a discharge which may or may not have an odor. This discharge is of a reddish brown or grey color and contains the germs. This discharge may accumulate in the uterus and be expelled periodically by violent straining.

The foetal membranes or afterbirth is often retained. The cow may come in heat shortly after or a number of days after abortion and in this way infect the bull. If abortion is not complicated by retained afterbirth or sterility, it does not greatly affect the health of the animal. The cow continues to eat and acts normally.

Cows do not abort indefinitely. About fifty per cent abort once, some twice, and a small percentage may slip their calves the third time.

Cows may become immune after aborting from one to three times and bring normal calves, but some may still be able to infect other cows or the bull; hence, the difficulty in controlling the disease.

If the cows become immune in a few years the abortion will occur only in heifers or in newly-purchased animals brought into the herd, and finally the disease may disappear from the herd entirely. This disease may persist for years in a herd if proper and strict sanitary measures are not employed.

DIAGNOSIS

Not all abortions are due to contagion, but if a number of cows in a herd abort during the year, showing a discharge and retained afterbirth, one may reasonably conclude for all practical purposes that they have contagious abortion—at least it should cause suspicion. There are no symptoms by which this disease can be determined with accuracy. Investigators make use of bacteriological and serological tests, blood tests where the blood serum is tested by laboratory methods known as the agglutination test, also the complement-fixation test.

PREVENTION, CONTROL, AND TREATMENT

Contagious abortion in mares or cows to be prevented, controlled or treated requires a careful and detailed study of each

outbreak and of every case in the outbreak. The same general measures should be practiced with both mares and cows.

Every precaution should be taken to prevent the disease from getting on the ranch or farm, the pasture or feed lot, or in the corrals or barns. Great care should be exercised in bringing new animals on the premises. Very often such animals are infected with abortion. It is becoming very difficult to purchase good breeding animals. In purchasing animals where it is not known whether or not they are free from abortion, one should keep them in separate quarters, where possible, until one is fairly sure they are free from disease (two or three weeks or a month).

Many stock raisers sell off the aborting animals as fast as they abort and very often such animals are bought for breeding purposes by some one not familiar with the disease, thus spreading the infection to new uninfected areas, animals, and premises. It has been pointed out that many animals only abort once and will then carry the offspring to maturity; therefore, it would be much better to keep such an aborting animal unless she is otherwise unprofitable.

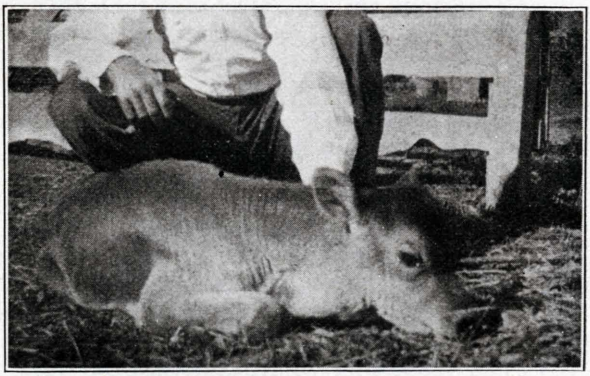


Fig. 7—Enlarged glands and joints resulting from infection.

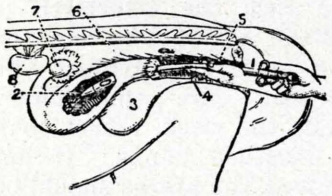
When a man sells one of his breeding animals he usually replaces it with another. Abortion existing in his herd, he may bring in a new susceptible animal or buy one that is not better than the one disposed of and he is no better off than before. If aborting animals are not otherwise unprofitable, they should be kept and treated; however, if cows are sterile or otherwise

unprofitable and will not yield to treatment they should be sold for beef and not for breeding purposes.

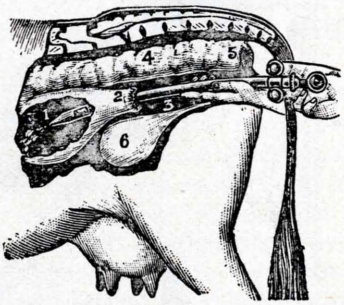
If a male is not kept for breeding animals, great care should be exercised to know that the animal used for service is free from this disease. Otherwise the infection may be transmitted to the clean animals.

Most stock raisers desire to improve their animals. This being true, the young are the most valuable ones, due to the improvement by selection and proper mating. Therefore, such animals should be kept, and where they are raised with animals having this disease they often become more or less immune, and a good bunch of breeding animals can be developed.

When an animal aborts, isolation is of great importance. In case it occurs in the stable the aborting animal should be isolated from the other animals and moved to a place where she can be carefully looked after. The foetus and membranes should be immediately carried away and destroyed by burning. If this is impractical they should be deeply buried,—after covering with a good disinfectant consisting of lime or some good coal tar



Anatomy of the Mare.



Anatomy of the Cow.

Fig. 8—Reproductive organs of mare and cow.

product (a germ killer). All the aborted material and all discharges should be taken proper care of since germs are extremely numerous in this offscum. The vaginal discharges should be properly disinfected and the genital passages irrigated with a mild warm antiseptic daily. This may consist of from one-half per cent to one or two per cent of carbolic acid (about one (1) ounce to the gallon of water), a solution of creolin, lysol, or some other good germ destroyer. This can best be accomplished with a soft rubber tube about 4 or 5 feet long. The end of the tube is

(1) 1 ounce—2 tablespoonfuls, 32 ounces in a quart.

inserted into the genital passages, the other end fitted to a funnel where the liquid is poured and the funnel end raised up higher than the animal so the liquid will flow in by gravity. Two quarts to one gallon of the warm solution is injected into the uterus and repeated daily as long as a discharge appears after which the intervals may be greater until the animal is to be bred. The external parts—vulva, tail, udder and thighs of aborting animals should be carefully washed with some antiseptic, but a stronger solution—from two to four per cent. Not only the aborting animals but the ones exposed that are pregnant should be treated in this way.

Some use about a 1-500 solution of permanganate of potash or two per cent Lugol's solution followed by a 1-per cent salt solution for this irrigation. This can be obtained at any drug store.

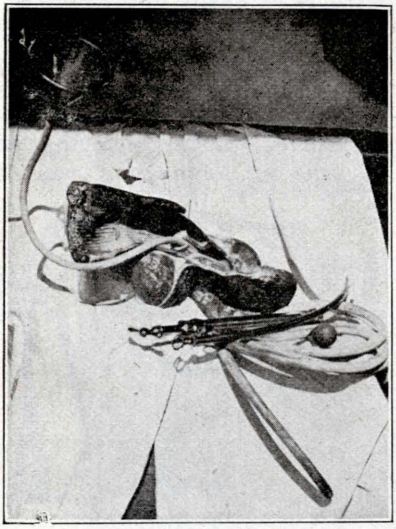


Fig. 9—Apparatus in proper place for flushing uterus.

An animal should not be bred for from two to three months after abortion and not even then if the discharge from the genital organs has not ceased.

In case the afterbirth is retained it should be removed by a qualified individual who exercises care and understands the work, rather than by unskilled hands. If not removed, the uterus should be irrigated with a gallon or two of some good warm disinfectant twice a day. This prevents the accumulation and absorption of the poisons emitted and also helps the membranes to come away. It often occurs that forcible and clumsy as well as unsanitary manipulations are practiced on animals with a retained after-birth. This work requires great skill and sanitary precautions, which only qualified and experienced veterinarians can properly give; otherwise, the living membranes of the uterus are torn or injured thus allowing a point of entry for germs which are responsible for grave infection (metritis or pyometra) and for blood poison.

The *Bacillus abortus equi* is destroyed with a 1 per cent solution of pottassium permanganate in one minute; a 1 per cent solution of carbolic acid also destroys it in the same length of time. A saturated solution of boric acid destroys this germ in three hours. Whenever water is used for irrigating the genital organs it should first be boiled, the chemicals added, and then cooled to about body temperature before injection.

TREATMENT OF THE BULL AND STALLION

Some investigators claim that the male is not as often responsible for transmitting this disease as is commonly supposed. However, to make sure, it is safer to treat him with some of the same kind of material used in cleaning the female. It is only reasonable to suppose if a male is bred to an aborting female, especially where such animal is still discharging virulent material, that he is very apt to become contaminated and transmit the infection to the next animals he is bred to. If the bull himself is infected the infection of the cow is sure to follow. In the case of the stallion, his penis and sheath should be irrigated with the same solution as described for the female. The parts surrounding the sheath and the thighs should also be washed with a disinfectant.

In the case of the bull it is well to first clip off the long hair from the opening of the sheath and then inject some of the same solution into the sheath, or use one-fourth to one-half per cent of Lugol's solution before and after service. (Give the cow a vaginal douche of same solution one or two hours before service.) This can be accomplished with the same kind of apparatus described for the female, inserting the rubber tube into the opening of the sheath and holding the end of the sheath so the liquid cannot flow out while filling it. When it is full rub the hand up and down outside the sheath so as to thoroughly disinfect all parts of the sheath and penis.

A regular container instead of the funnel can be secured. This container may have a faucet near the bottom to which the rubber tubing is fitted. This is suspended from the ceiling of the bull stall and can be conveniently manipulated, especially after the animal has been treated a few times. It should precede and follow every service. This same apparatus can be used in the stables suspended from the litter carrier or a wire behind the females and facilitate the work where a number are to be treated. One should never use too strong or irritating disin-

fectants as more harm can be done in this way than already exists. It may be better to only use warm water for the irrigation of the uterus.

MEDICINAL TREATMENT

Many different medicinal agents have been recommended and some have been heralded as specifics for contagious abortion. These results if obtained are more often due to errors of diagnosis or to the nature of the disease than the drug used for seemingly overcoming this trouble. Among the things most commonly used are carbolic acid, methylene blue and different bacterines and serums, besides the patent remedies advertised in many farm papers. At the present time it may be said with safety that NO RELIABLE SPECIFIC for abortion is known.

Standard antiseptics are much cheaper and more reliable than any or all proprietary remedies. Undoubtedly there will be a time when a vaccine is perfected which will protect animals against this disease.

Those having contagious abortion among their animals must use their best efforts to overcome it. They will have to be "on the job" and stay with it in order to be successful.

CLEANING UP THE STABLES AND PREMISES

Time, energy, and money should not be wasted on animals that are otherwise unprofitable; especially is this true with cows that are used for dairy purposes where one should know jsut what each cow produces. All such unprofitable animals should be disposed of to the butcher. By doing this, greater attention can be given to the best animals and thereby get better and more profitable results.

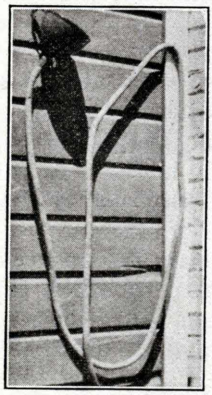


Fig. 10—Funnel and tube used for disinfecting genital organs.

Under no conditions should animals be sold unless for immediate slaughter without first telling the buyer about the infection they carry and the probable dissemination of this disease if introduced into another herd or used for breeding purposes.

Where abortion occurs in barns or stables, it is necessary to clean thoroughly such stables, first by removing all the litter to a place where the animals cannot

have access, then scrubbing the walls, floors, mangers, partitions, and all things contaminated, with a good antiseptic or with boiling water to kill all infection. The ceiling should be brushed and freed from all dust and cobwebs and a spray of some good disinfectant such as lime and carbolic acid, applied to the ceiling and walls daily for a short time. In addition to these precautions plenty of sunlight and fresh air should be supplied. The shoes, boots, clothing, and the hands of the attendants should be disinfected with a three or four per cent solution of carbolic acid or creolin.

The best means for applying the disinfectants on the premises is by means of a good spray pump (such as orchardists use for spraying trees.) This drives the disinfectant into all the cracks and corners. The yards can also be sprayed with some of the same disinfectant to good advantage.

Advantage should be taken of nature's best disinfectant—sunlight. An ample number of windows should be provided in barns or stables to allow the sunlight and fresh air to enter. Muddy, undrained yards, accumulations of manure and litter, and unsanitary surroundings in general make it almost impossible to control this or any other contagious disease.

SUMMARY

A disease known as contagious, or infectious, abortion has been and is prevalent among the livestock in this state.

Breeding animals are affected in nearly all parts of Utah, especially where such animals are numerous.

Accidental and contagious abortion exists; but where a number of abortions in a herd have existed without seemingly any cause, contagious abortion should be suspected.

This disease is caused by a germ known as the bacillus of abortion. It is transmitted from animal to animal of the same species by contact and association, by contaminated milk, feed and water, by copulation, and by infected quarters where animals are kept.

The germ gains access to the uterus of a pregnant animal causing trouble to the foetus and a separation of the foetal membranes (afterbirth) from the dam. It can usually be found in the uterus, udder, afterbirth, and discharges of the aborting animal. Animals may harbor this disease and yet not abort. This is determined by the agglutination test.

Symptoms vary in different animals largely depending on

the period of gestation when abortion occurs. There is a discharge of mucous of a viscid, yellowish-brown color and may be stained with blood.

The vulva and udder may swell; the animal becomes restless and finally expels the foetus.

This may occur any time from about thirty days after service to the full period of gestation.

WE HAVE NO SPECIFIC CURE FOR CONTAGIOUS ABORTION.

Animals aborting should be quarantined and treated with antiseptics.

Animals about to give birth to offspring should be disinfected externally, the tail, vulva, udder and legs.

The aborted foetus, foetal membranes, and discharges should be burned or disinfected and deeply buried. The stalls, corrals, and feed lots should be cleaned and sprayed. The floors, gutters and all wood-work of the stable should be scrubbed with hot water, disinfected, and whitewashed. The contaminated manure and litter removed from infected places should be hauled away where animals will not have access to it.

Aborting and quarantined animals should have the genital passages irrigated daily for four or five days with a one per cent solution of lysol or creolin or two per cent Lugol's solution followed by salt solution, or other good disinfectant. After this time the irrigations can be applied at longer intervals apart until all discharge ceases.

Animals that have aborted should not be bred for two or three months and not then if a vaginal discharge is noticed.

Stallions and bulls in infected herds should have their genitals, sheath, and the skin surrounding these organs thoroughly disinfected before and after service.

Aborting animals if otherwise profitable should not be sold especially for breeding purposes; but if aborting cows are unprofitable they should be sold for beef.

All breeders of livestock should do everything possible to keep this malady away from their animals and those having this disease among their herds should immediately take up a campaign for its eradication.